UNIVERSITY OF CALIFORNIA.

AGRICULTURAL EXPERIMENT STATION.

BULLETIN NO. 46.

Grafting and Fruiting of Resistant Vines.

In a bulletin issued two weeks ago, the results of a large-scale experiment in grafting the California wild vine were presented, showing an unusually favorable outcome both as regards the percentage of successes in grafting on two year-old stocks, and the remarkably early and abundant bearing of the grafts: these facts being entirely in accord with the results of well-guarded experiments made heretofore both at the University and elsewhere. I am now enabled to present a statement from Prof. George Husmann, of Napa, giving the results of his experience in grafting on resistant stocks of other varieties of the *æstivalis* and *riparia* class. This statement is the more interesting as it includes trials, alongside of one another and on soils greatly varied, not only of these different stocks, but also of grafts in great variety, both of American and European, or *vinifera* origin.

The claims of the *æstivalis* (or Eastern summer grape) varieties to our attention, as vigorous resistant stocks, have hardly received sufficient consideration as yet. In the selection of the stocks to be used in a given locality, their natural habits should not be overlooked; for the more nearly the conditions of these are realized, the more vigorous and long-lived will the stock be, other things being equal. The natural "habitat" of the *riparia* or riverside grape is that which its name indicates. The same is true of the *cordifolia*, neither of the two being, in their natural condition, found outside of, or far from, the bottoms or borders of streams. Good culture can, of course, in a great measure replace these natural conditions: yet under stress of season or soil, the original adaptation will make itself felt more or less, and will frequently turn the scale for or against a paying crop.

The wild *æstivalis* grape is prevalently found in the uplands of the Mississippi valley, although it very commonly descends into the valleys of the smaller streams; it is never found within the larger bottoms. This implies that it needs a smaller supply of moisture for its full development, and that while it *can* flourish even with "wet feet," its preference lies towards well-drained soils. This greater adaptability is a matter of no mean importance, especially when it is understood that in the Mississippi valley there is on the whole a much wider difference between upland and bottom soils than is ordinarily the case on the Pacific Coast; a natural result of the difference in respect to rainfall. The *æstivalis* will therefore be content with soils of a relatively inferior fertility, where the *rivaria*, and the still more rank-feeding *Californica* would make but a feeble growth. This fact explains the very general acceptance of Lenoir stock in Europe, where very productive soils, like those of the virgin bottoms of the Mississippi valley, and especially of California, are a rare exception. Like all other stocks that may fairly be classed as resistant for practical purposes, the Lenoir may be overtaxed when *too* much is asked of it in the way of frugality; and may thus occasionally succumb to the attack of the phylloxera; but in its proper place, it, like other *æstivalis* varieties, proves a most valuable stock.

In the *rupestris* we have a very resistant stock, whose native habits would seem to adapt it even more than the *æstivalis* varieties to stony upland soils of only moderate fertility, in which the *riparia*, as well as the *Californica*, would prove unsatisfactory. The *rupestris* is rather a slow grower, but very hardy, and makes a stock of very good shape for grafting.

Just as every intelligent fruit grower will carefully consider, when planting an orchard, what will be the stocks best adapted to his soil and locality; so the grape-grower must consider, so far as experience or other considerations can forecast it, which among the resistent grape stocks will be likely to do best in his vineyard. An improper choice will be just as fatal to success in one case as in the other; there is no *one* stock that is adapted to *all* cases.

E. W. HILGARD.

Berkeley, October 29, 1885.

TALCOA VINEYARDS, NAPA, Oct. 24, 1885.

Prof. E. W. Hilgard, State University, Berkeley, Cal.—DEAR SIR:—As you desire reports about resistant vines, and grafting thereon, I will give a short *resume* of my experience here on perhaps the most difficult and varied piece of ground to be found in the State; being "spotted" with tough adobe, hard-pan alkali, poor stony soil, and rich alluvial lands, and therefore a harder and more severe test for them than is ordinarily found.

The new vineyards at this place, comprising about 150 acres, were planted by me mostly in 1882. The varieties planted were for immediate bearing: Lenoir, Herbemont, Cynthiana, Rulander and Norton's Virginia, all *æstivalis* varieties; and for grafting, about 10,000 wild riparia seedlings, 15,000 Clinton, and some few thousand each of other *riparia* varieties, such as Elvira, Missouri Riesling, Taylor, Uhland, Amber, Pearl, Marion, etc. Each variety runs, in most instances, from one end of the vineyard to the other, thus getting the benefit or disadvantage, as the case may be, of a variety of soils. In another piece of land we planted *rupestris* cuttings the same season, which also have about the same diversity of soils. I find a great difference in growth on the different soils, the most vigorous being on the alluvial and adobe, the poorest on the hard-pan alkali. This

may be considered applicable to all varieties planted, although the Herbemont seems to grow and succeed best an all soils. A piece of about an acre of the last named variety, planted in 1881, has been in partial bearing for two years, has always set its fruit well and ripened evenly. The same was the case this year, when it bore a very heavy crop, many of the vines producing 40 to 50 lbs each, and ripening their fruit evenly and well, the must showing 24° on Balling's scale on the 5th day of this month. All the *æstivalis* varieties, however, need a six-foot stake, and long pruning on canes or arms, to show their full bearing capacity. The same may be said of the Rulander or St. Genevieve, which set well and bore a splendid crop on three-year-old vines, must showing 26° Balling the 28th of September, when we picked them. The Lenoir, Norton's and Cynthiana set but a very light crop, owing, as I think, to the high winds which prevailed here all summer. They ripened early in September, Lenoir showing 27°, Norton's 30°, Cynthiana 32° Balling, the must being of an exceedingly dark color, purplish black. All promise to make very fine wines, and as the vines are yet too young to show their full bearing capacity, I hope for a better yield next year.

In the spring of 1884 we grafted what was strong enough of the wild *riparia*, and the *riparia* varieties, although from the difficulties presented by the soil already mentioned, we had a very uneven stand. Our method was common cleft grafting, and has been described before. We grafted on the wild *riparia* seedlings, as follows: Sultana, Green Hungarian, Sauvignon Vert, Marsanne and Franken Riesling (Sylvaner). A part of the last two varieties, five rows, were grafted on Elvira, running parallel through the blocks with the *riparia*. The great majority of the grafts took well, made a firm junction and a very strong growth where the vines were on favorable soil, but on the Elvira the success was rather more uniform and the growth stronger than on the wild *riparia*. The balance of our grafts were mostly on Clinton, which proved a much more satisfactory stock than I had anticipated, being in that respect as good as the wild *riparia*, and taking the graft readily. The grafts on Clinton were Herbemont, Lenoir, Pedro Ximenes, Chauche Gris, Traminer, Rulander or Grey Clevner, Petit Pinot, Gamay, Teinturier, Mataro and Grosse Blaue. The Taylor, although a very strong grower, does not seem to take the graft as readily as the three varieties named before, as our success was not as uniform and satisfactory.

The grafts produced some fruit last year, were pruned for bearing last winter, according to their strength, and most of them bore very heavily: with a great difference, however, in the same variety where they were exposed to the full force of the wind or sheltered by the hillside, the latter producing more than double. The yield was especially heavy on Green Hungarian, Marsanne, Sauvignon Vert and Mataro. In a good many instances we gathered 30 to 40 pounds of Marsanne and Green Hungarian from a single graft, and the growth of wood for next year's crop is also strong and well ripened. The junction is so complete that it is hardly perceptible now, and the whole operation is a complete success. The branches were very large and heavy, and the berries full size and of excellent quality, as a number of visitors, Messrs. E. H. Rixford and Wickson among them, can testify. Our wines, made from each variety separately, are fully fermented and many of them clear now. When the time comes I shall take great pleasure in sending you samples of them for tasting and analysis.

I am fully satisfied that instead of losing time by planting resistant vines and grafting them, the grafts will bear more and earlier than the same varieties would do on their own roots, on account of the increased vigor caused by the stronger growth of the stock.

As to the alleged inferiority of the fruit and wine from such grafts, it seems too ridiculous for any one at all familiar with the laws governing horticulture, and the influence of the stock on the scion, to need refutation. In the case of grafts on vines, I have found, during a practice and observation of 35 years, that a stronger stock also imparts a more vigorous growth of wood, and we all know that the more vigorous the tree or plant, the larger and more perfect will be its fruit. That such stronger growth also requires longer pruning to equalize the strength of the root and top, is self-evident, but I have yet to learn that our growers would object to the increased yield resulting therefrom. In my opinion, the greatest perfection of the grape depends upon having just as much to bear each season as it can ripen in perfection. If we overload it, inferior, insipid fruit will be the result, and a feeble growth of wood, which will also not ripen fully. If, on the contrary, we prune too short, a rank, succulent growth, black knot, coulure, etc., will be the result, and the fruit will also suffer accordingly. On this nice balancing of the powers of the vine, more of the success of the vintner depends than many are aware of.

That resistant vines, planted on soil of ordinary fertility, are and will be a success, I am confident beyond a doubt. That thousands of acres have been planted to vines in this State, which are entirely unfit for resistants or any other vines, I am also convinced, and the sooner our people learn that even a grapevine will not grow in waste and barren places, too poor to produce even sagebrush, the better it will be for the industry. Yours sincerely,

GEORGE HUSMANN.